

**Core Curriculum  
Course Proposal Cover Sheet**

**Department:** Chemistry, Geosciences, and Environmental Science

**College:** Science and Technology

**Department Head:** Dr. Arthur A. Low

**Course Prefix & Number:** CHEM 105

**Course Title:** College Chemistry I

**Course Description:**

Topics to be covered include an introduction to fundamental chemical laws, Scientific Method and measurement, atomic structure and its relationship to chemical bonding and the periodic properties of elements and compounds, stoichiometry, states of matter, and solutions.

This course is required for science majors and pre-professional students who meet requirements for enrollment in MATH 107-3 or higher.

The course consists of three (3) lecture hours per week and three (3) laboratory hours per week for 4 hours of college credit.

**THECB Foundational Component Area for which this course is being submitted.**

**Life and Physical Sciences**

**Checklist:**

Course Proposal Cover Sheet

Foundational Component Area Justification Form

Student Learning Outcome Alignment Form

# **LIFE AND PHYSICAL SCIENCES**

## **FOUNDATIONAL COMPONENT AREA JUSTIFICATION FORM**

Rationale: Please provide a rationale for the course which explains how the course being proposed fits into this component based on the component's description. For your convenience, the overall description and rationale for this component are included below.

Life and Physical Sciences (from THECB Chapter 4: 4.28)

Courses in this category focus on describing, explaining, and predicting natural phenomena using the scientific method.

Courses involve the understanding of interactions among natural phenomena and the implications of scientific principles on the physical world and on human experiences.

The following four Core Objectives must be addressed in each course approved to fulfill this category requirement: Critical Thinking Skills, Communication Skills, Empirical and Quantitative Skills, and Teamwork.

- Critical Thinking Skills: to include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information;
- Communication Skills: to include effective development, interpretation and expression of ideas through written, oral and visual communication;
- Empirical and Quantitative Skills: to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions;
- Teamwork: to include the ability to consider different points of view and to work effectively with others to support a shared purpose or goal.

### **Rationale for Inclusion in this Category:**

**Chemistry** is the basic and fundamental central science required for proper understanding of other scientific disciplines such as biology and geosciences.. It is defined as the study of matter and the changes it undergoes. Lectures focus on describing and explaining current theories of chemical phenomena using the scientific method, and the student is required to use the knowledge gained to explain and predict observations on quizzes and exams. Each course also has a required laboratory component in which the student performs experiments utilizing empirical, quantitative, and critical thinking skills. Selected experiments also involve teamwork. All experiments require written communication skills to report their observations, discussions and conclusions,

**STUDENT LEARNING OUTCOME ALIGNMENT FORM**  
**Life and Physical Sciences**

**Course Prefix/Number: 105**

**Course Title: College Chemistry I**

**Core Objective: Critical Thinking** CT1: Students will evaluate evidence in analysis, interpretation or arguments

Course SLO(s): Students will demonstrate the ability to employ critical thinking skills.

Learning Activities: Students are presented with homework problems from “MasteringChemistry” (online homework – Pearson), exams, and laboratory exercises in which they are presented data that they must analyze and interpret.

Means of Assessment: All students in Chemistry 105 take a common departmental final exam, and the student’s performance will be assessed based on their mastery of specific questions addressing this SLO. Our initial target goal is 70% of the students achieving 70% mastery of these questions.

**Core Objective: Critical Thinking** CT2: Students will synthesize varied components of information to form a rational conclusion.

Course SLO(s): Students will demonstrate an understanding of the principles of scientific inquiry.

Learning Activities: Students are presented with homework problems from “MasteringChemistry” (online homework – Pearson), exams, and laboratory exercises in which they are presented data that they must analyze and interpret.

Means of Assessment: All students in Chemistry 105 take a common departmental final exam, and the student’s performance will be assessed based on their mastery of specific questions addressing this SLO. Our initial target goal is 70% of the students achieving 70% mastery of these questions.

**Core Objective: Communication** C1: Students will express ideas in written, visual or oral forms to a range of diverse audiences in multiple settings.

Course SLO(s): Students will demonstrate the ability to clearly and concisely state their observations of chemical phenomena and their conclusions based upon these

observations in a manner that is easily understood by the instructor and their laboratory partners.

**Learning Activities:** Students perform a series of 11 laboratory experiments in Chemistry 105. All experiments require submission of a lab data sheet showing all data collected, calculations, and results/conclusions. A selected experiment will require submission of an additional formal written lab report.

**Means of Assessment:** The formal written laboratory report will be scored using a rubric designed to assess written communications skills. The target goal is that 70% of the students will demonstrate 70% mastery in all of the above activities.

**Core Objective: Empirical and Quantitative** EQS1: Students gather, interpret or use numerical data/observable facts to arrive at an informed conclusion.

**Course SLO(s):** Students will be instructed on how to perform laboratory experiments, collect data, make observations, and reach conclusions based upon these observations. The students will then be presented with unknown samples on which they will conduct their own experiments.

**Learning Activities:** Students will be presented with unknown samples and required to perform data collection, data correlation, and analysis to identify or determine the concentration of their unknowns in several laboratory experiments. The students then report their data, calculations, and conclusions on the lab data report sheet.

**Means of Assessment:** Students are assessed on the accuracy and precision of their data, the accuracy of their calculations, and the accuracy of the final conclusion. The target goal is that 70% of the students will demonstrate 70% mastery in all of these activities.

**Core Objective: Teamwork** TW1: Students will work in coordination to complete specific tasks.

**Course SLO(s):** Students will work in teams and coordinate their efforts during specified laboratory experiments to increase their efficiency in data gathering and will work as teams to generate formal written lab reports for these experiments.

**Learning Activities:** Students will work in teams and coordinate their efforts during specified laboratory experiments. The students will work in pairs in each experiment to

gather their data, analyze it, and reach conclusions about the phenomenon observed. The groups will then work together outside of the lab to prepare laboratory report.

Means of Assessment: Each pair of students will turn in their individual lab data sheets, which will be scored in the usual manner. Each student will submit a confidential evaluation of the effectiveness of the other team member that will be assessed with teamwork rubric. The target goal is that 70% of the students will demonstrate 70% mastery in both the individual and group portions of these activities.

As department head, I will ensure that all faculty that teach this course are aware of the requirements that these core objectives and learning strategies be incorporated into the above referenced course. This action is taken so that Tarleton State University will be in compliance with Texas Higher Education Coordinating Board foundational component area and core objective requirements for the General Education Core Curriculum.

Signature\_\_\_\_\_

We, the undersigned faculty, support the proposed changes to this course and agree to incorporate them into our section of the above referenced course. This action is taken so that Tarleton State University will be in compliance with Texas Higher Education Coordinating Board foundational component area and core objective requirements for the General Education Core Curriculum.

*(Signed document should be kept in department office, listing names below on the electronic document implies acceptance)*